

A New Fossil Land Snail (Gastropoda: Pulmonata: Polygyridae) from the Middle Miocene of Northern Florida

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ABSTRACT

A new fossil land snail, *Praticolella prisca* n. sp., is described from the Charlton Member of the Coosawhatchie Formation (middle Miocene) at Brooks Sink, Bradford County, Florida. This new species is assigned to *Praticolella* s.s. Martens, 1892 based on sculpture, palatal lip expansion and a narrow constriction behind the lip. This subgenus is presently confined to central and southern Texas and Mexico under environmental conditions known to have occurred in northern Florida during the Miocene. *Praticolella prisca* n. sp. appears to be the earliest known member of the genus.

Key words: Gastropoda; Polygyridae; *Praticolella*; Miocene; Florida.

INTRODUCTION

Collections of invertebrate fossils containing a new species of terrestrial gastropod, *Praticolella prisca* n. sp., were made by the authors in the mid 1980's from Brooks Sink, a large, nearly circular, vertical-walled sink hole located 16.89 kilometers west of Starke, Bradford County, Florida (figure 1). Brooks Sink provides one of the best natural exposures of Hawthorne Group sediments in Florida. Exposed in approximately 23.0 meters of section are, in ascending order, the Marks Head Formation, the undifferentiated Coosawhatchie Formation, and the Charlton Member of the Coosawhatchie Formation (figure 2).

The age of the Charlton Member (formerly Charlton Formation) was considered to be Pliocene by Veatch and Stephenson (1911) and Cooke (1943, 1945). Based upon ostracods from this unit, identified by Harbans Puri as middle Miocene and/or upper Miocene, Pirkle (1956) reported the age to be older. More recently, Jones and Portell (1988) recognized the middle Miocene clypeasteroid echinoid, *Abertella aberti* (Conrad, 1842) from this unit. Huddleston (1988) assigned an age of middle Miocene to the Charlton Member in Georgia based on molluscan faunas, stratigraphic relationships, and the occurrence of several age-diagnostic planktonic foraminifera. Jones and Portell (1988) reported over 30 fossil invertebrate taxa within the Charlton Member of the

Coosawhatchie Formation at Brooks Sink including *Praticolella* sp., the taxon described below.

MATERIALS AND METHODS

No fossilized shell material was recovered. The specimens representing this taxon are preserved only as internal and external molds comprised of fine-grained dolostone. We use the term external mold to indicate the impression in the matrix of the outer surface of the shell. The matrix containing the external mold UF 14397 was reduced and the specimen sonicated for observation of the shell ultrastructure under a scanning electron microscope. Some of the specimens are incomplete in certain aspects. Nevertheless, standard shell parameters were measured with vernier calipers whenever possible. All specimens are repositied in the Florida Museum of Natural History, Invertebrate Paleontology Division, University of Florida, Gainesville, Florida 32611.

DESCRIPTION

Family **Polygyridae** Pilsbry, 1930
Subfamily **Polygyrinae** Pilsbry, 1895
Genus *Praticolella* Martens, 1892
Praticolella prisca new species
(figures 3-10, table 1)

Adult shell large (width 10.0-13.9 mm, height 6.7-10.0 mm); helicoid, depressed-globose, 0.64-0.72 times as high as wide; spire moderately elevated, convex in outline (figures 3, 6, 7); base round and inflated; the 4.6-5.0 convex whorls slowly increasing in size (figure 4); sutures impressed; body whorl large, slightly flattened at suture, round at periphery and below; deflection variable, slightly upward or downward in the final 0.25 whorl, but always descending very slightly before constricting and inflecting; narrowly constricted posterior to palatal lip, more deeply constricted along base (figures 4, 6); umbilicus narrow, tubular, about 0.10 the diameter of shell and partially covered by reflected columellar lip (figures 5, 8); the 1.7 protoconch whorls are smooth except for a



Figure 1. Location of Brooks Sink in Bradford County, Florida (SW $\frac{1}{4}$, SW $\frac{1}{4}$, sec. 12, T7S, R20E, Brooker 7.5 Minute Quadrangle).

few axial striations on the last 0.20 turn (figure 10); subsequent whorls are smooth except for a few axial striations on the last 0.20 turn (figure 10); subsequent whorls and base with fine, irregular, oblique axial striations, strongest at the suture (figure 9); spiral sculpture absent; aperture lunate and relatively large, 0.85 times as high as wide; parietal and palatal barriers absent; palatal lip broadly expanded, thickened within (figure 7); in lateral view lip moderately reflected along periphery and base, expanded forward above, unreflected (figure 6).

Etymology: The species name *prisca* is derived from the Latin *priscus*, meaning ancient.

Type locality: Brooks Sink, 16.89 kilometers west of Starke, Bradford County, Florida (SW $\frac{1}{4}$, SW $\frac{1}{4}$, sec. 12, T7S, R20E, Brooker 7.5 Minute Quadrangle), Coosawhatchie Formation, Charlton Member, approximately 8.0 meters below surface.

Holotype: UF 14446, 12.5 mm width, 8.9 mm height, internal mold, protoconch missing.

Paratypes: Width 10.0–13.9 mm, height 6.7–10.0 mm; UF 14395, 5 adults, internal molds; UF 14397, 1 adult, external mold and rubber peel; UF 14406, 1 adult, external mold; UF 14407, 1 adult, external mold and rubber peel; UF 14408, 1 adult, internal mold; UF 14450, 1 partial adult body whorl, internal mold.

Other material examined: UF 28983, 9 fragments, internal molds; UF 14405, 1 subadult, external mold and rubber peel; UF 14433, 1 adult, external mold and rubber peel; UF 14443, 1 adult, internal mold; UF 22347, 4 adults and 3 fragments, internal molds; UF 22348, 6 juveniles, internal molds, obtusely angulate at periphery and have indications of growth stoppage at 3.5–4.0 whorls.

COMPARATIVE REMARKS

The external mold UF 14405 (figures 7, 8) is tentatively assigned to this new species. It is slightly smaller and more depressed (10.5 mm wide, 6.7 mm height) than most of the other specimens. The palatal lip is simple,

Table 1. *Praticolella prisca* new species. Linear shell measurements (mm) and whorl counts of holotype and 9 paratypes. Most of the specimens are incomplete in some aspects, hence the different N for the measured parameters.

Character	N	Range	\bar{x}	SD
Shell width	10	10.0–13.9	12.0	1.2
Shell height	5	6.7–10.0	8.5	1.1
Height/width	5	0.64–0.72	0.68	0.03
Aperture height	2	5.5–6.2	5.9	0.4
Aperture width	2	6.4–7.2	6.8	0.4
Ap. height/Ap. width	2	0.85	0.85	0.0
Umbilicus width	7	0.8–1.5	1.1	0.2
Umb. width/shell width	7	0.07–0.11	0.09	0.02
Whorls	4	4.75–5.5	5.2	0.3

except basally where it is barely reflected. The body whorl is slightly constricted on the basal portion. However, this specimen is identical to the larger, more globose specimens in other character-states such as sculpture, spire whorlation and umbilicus. It is our opinion that this is a small subadult of *Praticolella prisca* n. sp. and does not represent a second undescribed taxon.

The classification of pulmonate land snails is based primarily on features of the soft anatomy making assignment of fossil forms difficult. Within the Stylomatophora several families have evolved strikingly similar shell forms. Convergences in helicoid families such as the Camaenidae, Polygyridae and Helminthoglyptidae are frustratingly commonplace. However, careful analysis of various morphological shell character-states can elucidate differences and general trends within and between families. The combination of sculpture, palatal lip expansion and the narrow constriction of the body whorl suggest that this species is best assigned to the polygyrid genus *Praticolella* Martens, 1892.

Praticolella Martens, 1892 is characterized in shell form by its relatively small size, depressed-globose shape, rounded periphery, narrow umbilicus and rounded base. The aperture is lunate and the lip is slightly expanded or reflected and thickened within. The sculpture is of fine, irregularly spaced axial striations (Pilsbry, 1940). *Praticolella* is divided into three subgenera based on genitalic anatomy and sculpture of the protoconch (Pilsbry, 1940). The subgenus *Filapex* Pilsbry, 1940 has distinct spiral sculpture on the protoconch. *Farragutia* Vannatta, 1915 and *Praticolella* s.s. Martens, 1892 have smooth protoconchs. *Farragutia* is relatively smaller than *Praticolella* s.s., is slightly more depressed and has a less rounded base. *Praticolella prisca* n. sp. is clearly referred to *Praticolella* s.s. A close relationship to any extant species cannot be made.

The polygyrid genera *Mesodon* s.s. Rafinesque, 1821, *Neohelix* s.s. Ihering, 1892 and *Praticolella* Martens, 1892 are quite similar in general shell shape. *Mesodon* s.s. and *Neohelix* s.s. generally have distinct, regular axial striae and engraved spiral lines, while *Praticolella* has a smoothish shell sculptured only by weak, irregular axial

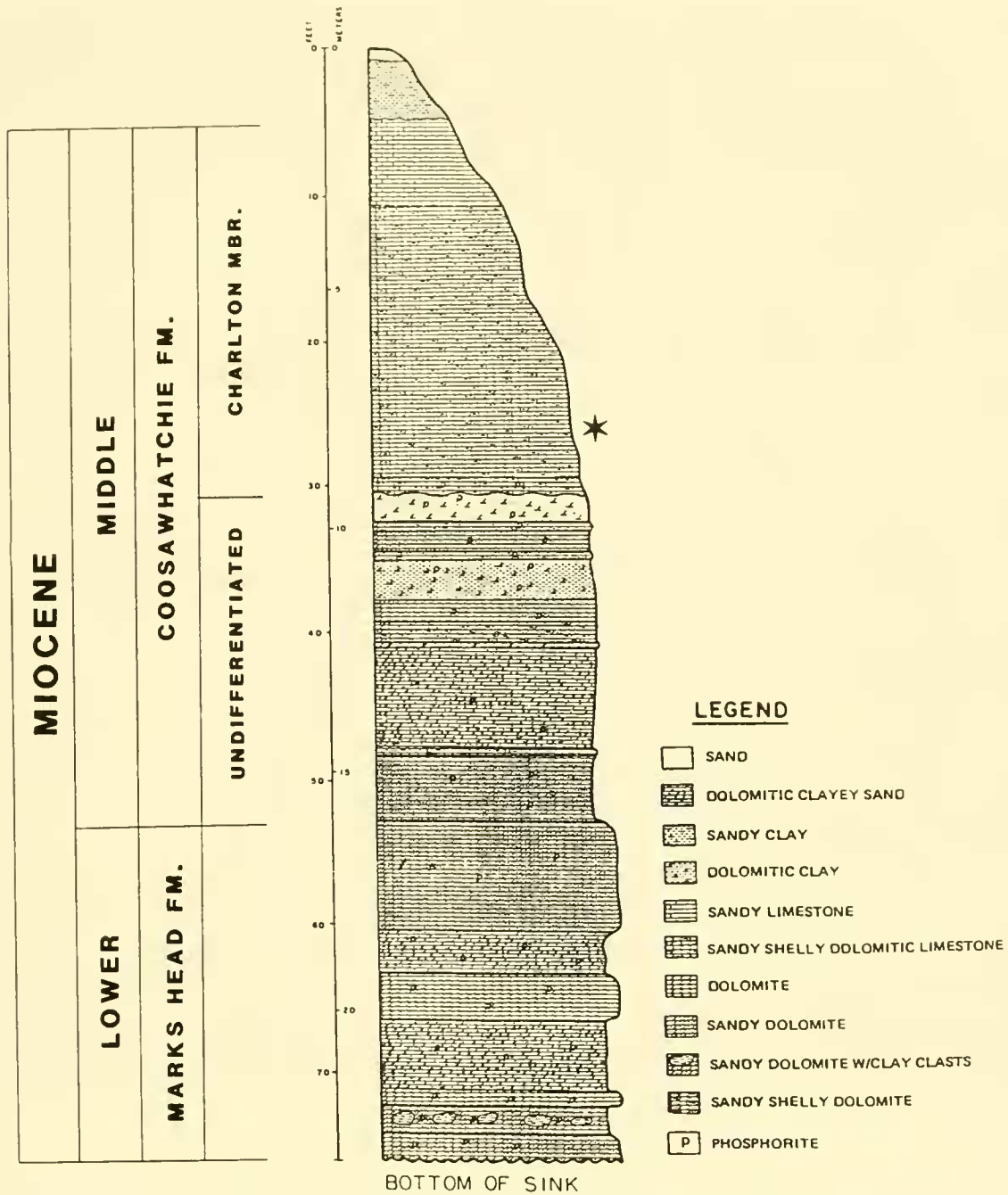


Figure 2. Geologic section at Brooks Sink modified from Scott (1982). Asterisk indicates zone where *Praticolella prisca* new species occurs.

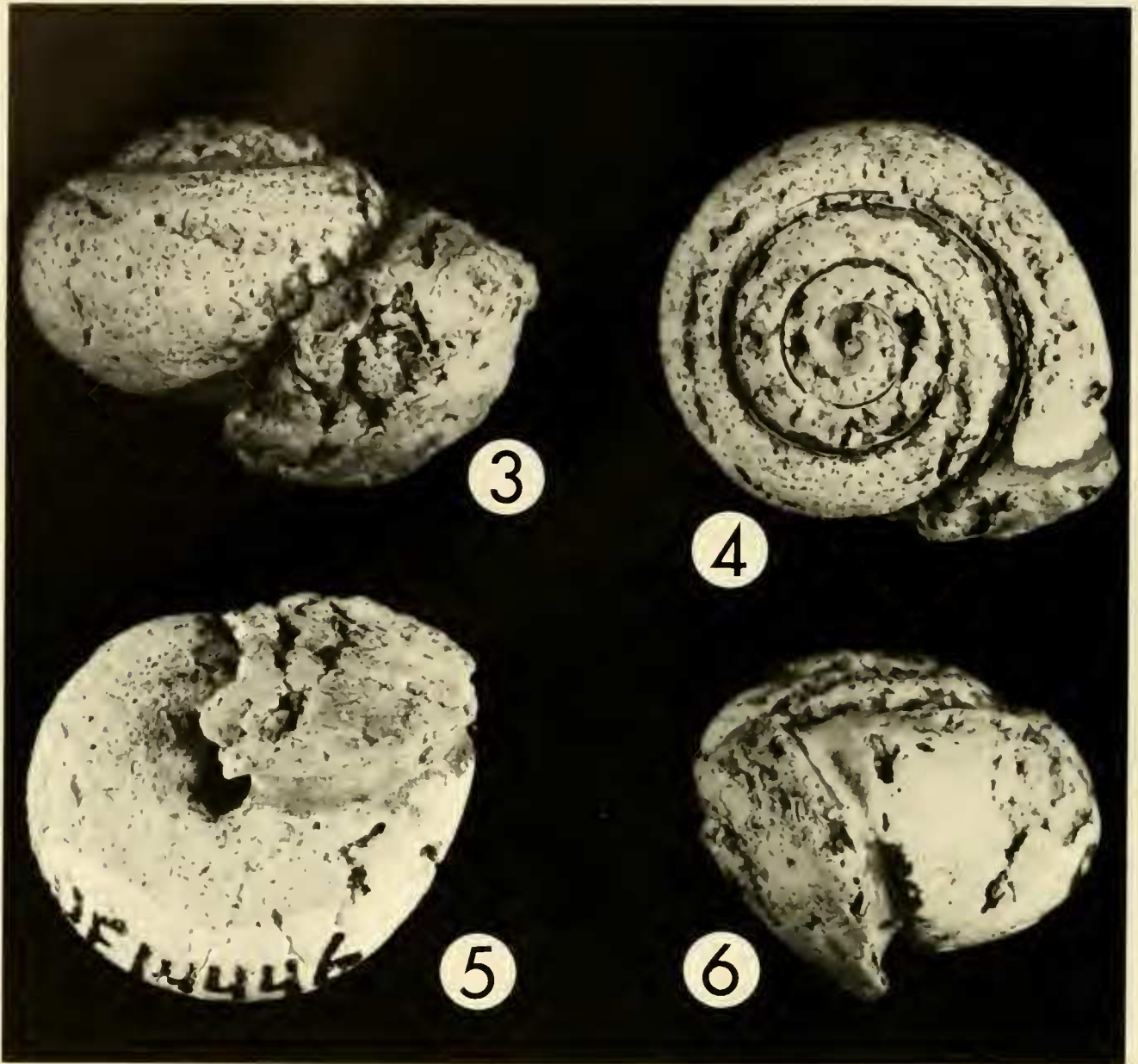
growth striae. The maximum shell size of *Praticolella* and the minimum size of *Mesodon* s.s. overlap, while *Neohelix* s.s. is much larger. The relative palatal lip width and degree of reflection of *Praticolella* rarely attains that of *Mesodon* s.s. The possibility that this new species is a small unsculptured *Mesodon* s.s. cannot be dismissed.

Praticolella prisca n. sp. superficially resembles the Miocene camaenids *Pleurodonte crusta* (Dall, 1890) and *Pleurodontites diespiter* (Dall, 1890). These species,

however, have papillose sculpture, shells which are larger and more depressed than *Praticolella prisca* n. sp. and body whorls which descend greatly over the last 1/4 turn.

DISCUSSION

The method of preservation of fossil mollusks has an important bearing on the interpretation of certain morphological characters. Internal molds are particularly dif-



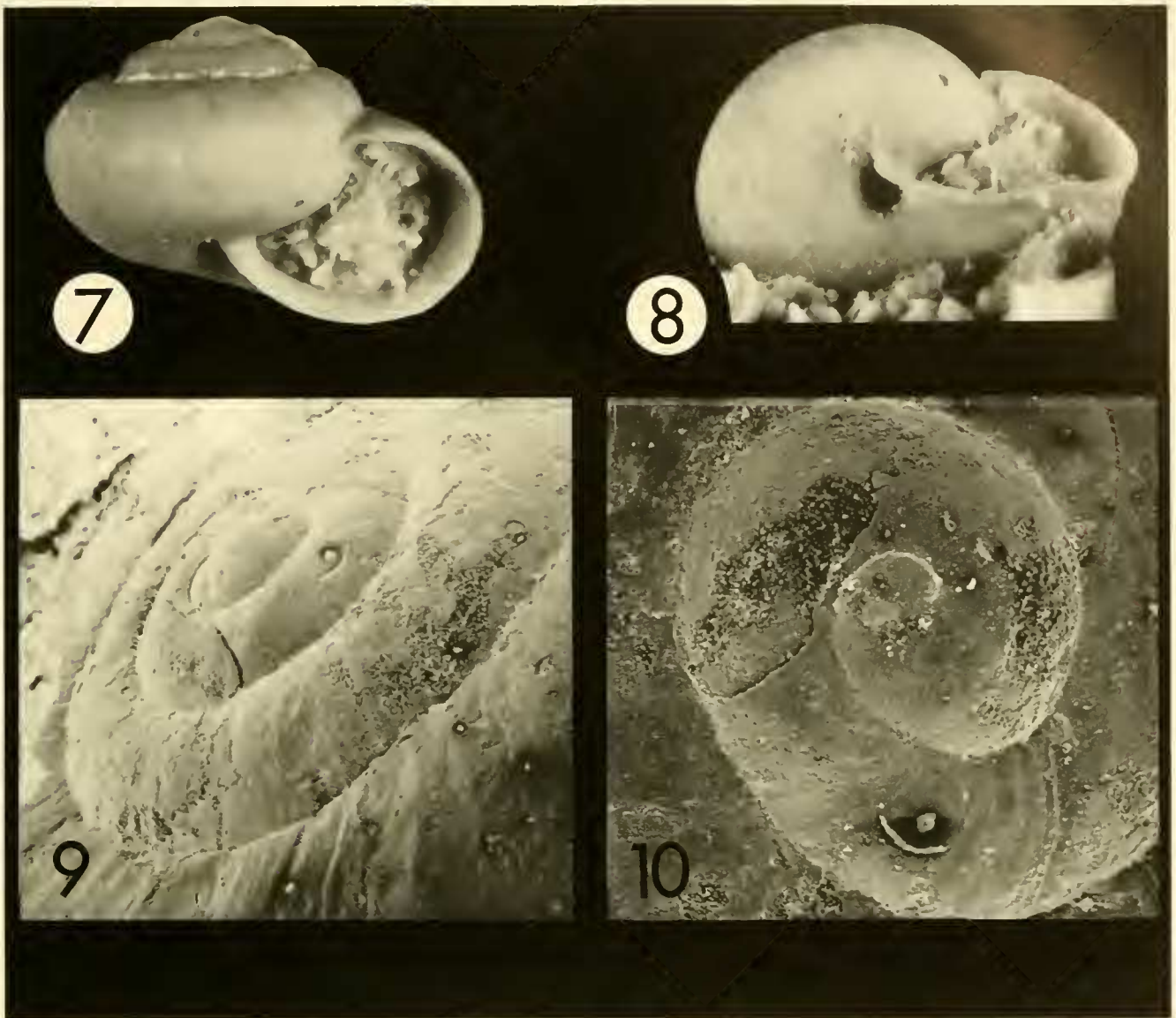
Figures 3-6. *Praticolella prisca* new species. Holotype, UF 14446, apertural, dorsal, basal, and lateral views, $\times 6.4$.

difficult to interpret. For example, if a shell with an internally thickened palatal lip is filled with and encased in sediment and the shell dissolves, the thickened portion of the lip may appear as a constriction on the outside of the body whorl. A true constriction may be greatly enhanced by this process. *Praticolella prisca* may in fact be only slightly constricted behind the lip or not constricted at all, only thickened internally. With more adequate material the true nature of this character-state will be better known.

To our knowledge *Praticolella prisca* n. sp. represents the oldest known member of this genus. Fossil forms of *Praticolella* s.s. Martens, 1892 from probably the late Pleistocene epoch of Texas are attributed to extant species

(Hubricht, 1983, 1985). This subgenus is presently confined in its native distribution to savannah and xeric habitats in southern and central Texas and Mexico. A similar savannah-like environment is known to have occurred in northern and central Florida during the Miocene (Webb, in press). This ecological association is compatible with the taxonomic assignment of *Praticolella prisca* n. sp.

Thirteen genera (23 species, 1 subspecies) of land snails have been recorded from the Miocene sediments of Florida (Dall, 1890, 1915; Mansfield, 1937). Eleven of these genera are extant. If current taxonomic assignments are correct, eight genera (61%) have Caribbean affinities, four genera (31%) probably emigrated from areas west



Figures 7-10. *Praticolella prisca* new species. 7, 8. UF 14405, apertural and basal views of rubber peel of external mold of probable subadult (see Comparative Remarks), $\times 6.6$. 9, 10. Paratype, UF 14397, scanning electron micrograph of protoconch of external mold. 9. $\times 28$. 10. $\times 47$.

of Florida, and one genus (8%) came from the north. The bulimulid genus *Hyperaulax* Pilsbry, 1897, which has an enigmatic distribution of several species from the Miocene of Florida and a single extant species on Fernando de Noronha Island off Brazil, is considered here to be part of the Caribbean component of the Miocene fauna. Many of the Miocene terrestrial vertebrates of Florida are believed to have been associated with both mesic and xeric tropical habitats (Auffenberg, 1963; Webb 1978, in press) and some appear to be closely related to groups now found in dry regions of Central America and Mexico. It is possible that some of these Florida Miocene land snails attributed to genera presently found only in the Caribbean region may be more appropriately as-

signed to genera occurring in mesic or xeric areas of Central America and Mexico and thus entered Florida via a dry tropical corridor along the Gulf of Mexico.

The fifty genera of native land snails presently found in Florida reveal a different zoogeographic pattern than is suggested by the fossil record. Of this current land snail fauna, sixteen genera (32%) are well-represented in the Caribbean region, six genera (12%) probably entered Florida from the West, while twenty-eight (56%) came from the North. This present zoogeographic pattern reflects the strong post-Miocene trend toward cooler, wetter climates, allowing immigration of the northern taxa into Florida. However, the timing of this immigration can not be determined from the fossil record.

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